Trend Study 17R-7-05

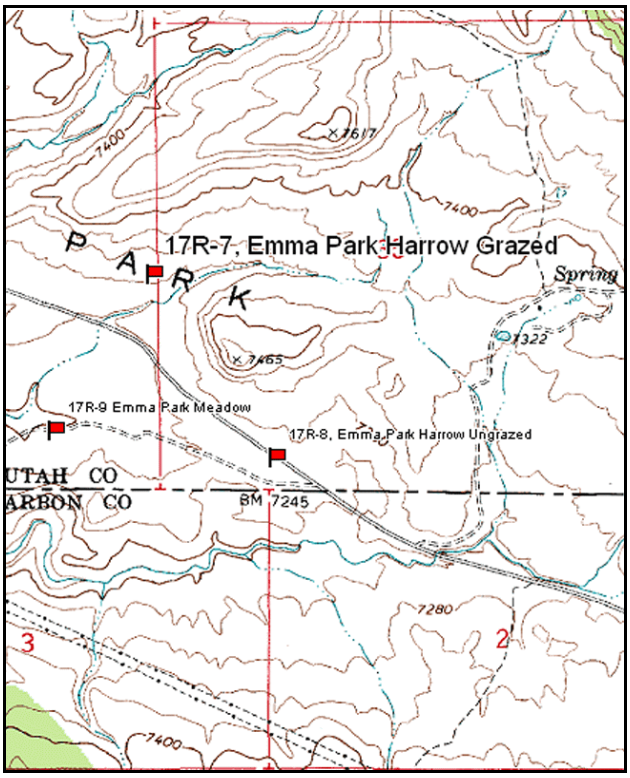
Study site name: Emma Park Harrow-Grazed . Vegetation type: Harrowed Big Sagebrush .

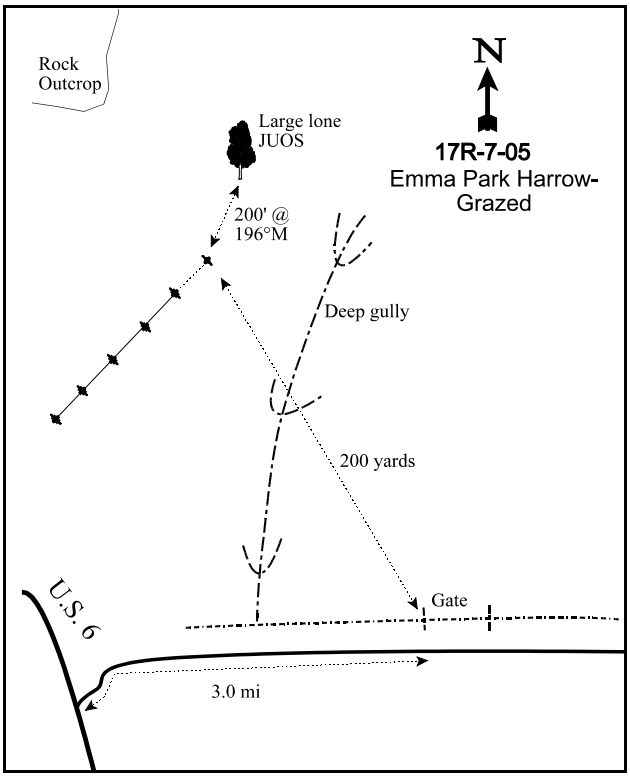
Compass bearing: frequency baseline 246 degrees magnetic.

Frequency belt placement: line 1(11ft), line 2(34 ft), line 3(59 ft), line 4(71 ft), line 5 (95 ft).

LOCATION DESCRIPTION

From the Kyune turnoff on U.S. 6 travel 3.0 miles to a gate on the north side of the road. From the gate walk approximately 200 yards towards a lone, large juniper on the other side of the deep gully. The 0-foot post is about 200 feet south of the juniper. The 0-foot stake is marked by browse tag #422.





Map name: Kyune

Diagrammatic Sketch

Township 11S , Range 9E , Section 34

GPS: NAD 27, UTM 12S 4407534 N, 508979 E

DISCUSSION

Emma Park Harrow Grazed - Trend Study No. 17R-7

The Emma Park Harrow Grazed study is located about 3 miles east of the junction of Highway 6 and Kyune in Spanish Fork Canyon. This study was established in 2001 to monitor a sagebrush pipe harrow treatment conducted by the Bureau of Land Management and Utah Division of Wildlife Resources. This area had been pipe harrowed one-way and seeded prior to placement of the transect. This study was paired with study 17R-8 to monitor site differences with and without livestock grazing following a pipe harrow treatment. Cattle grazing will still occur on this site, but not on study 17R-8. Pellet group data from 2001 was estimated at 9 deer and less than 1 elk days use/acre (22 ddu/ha and 2 edu/ha). No cattle pats were sampled. Pellet group data from 2005 estimated 5 deer, 5 elk, and 15 cow days use/acre (12 ddu/ha, 13 edu/ha, and 36 cdu/ha).

Elevation at this study is approximately 7,200 feet. The site has a gentle slope of 3-5% with a south aspect. Soils are clay loam in texture with a soil reaction that is slightly alkaline (7.5 pH). Phosphorus is very low at 2.8 ppm. Values below 6 ppm may limit normal plant growth and development (Tiedemann and Lopez 2004). A stoniness index determined from penetrometer readings indicated that most of the rock in the profile to be 8 to 16 inches below the surface. Effective rooting depth was estimated at less than 14 inches in 2001. An erosion condition class assessment done in 2001 and 2005 determined soils to be slightly eroding. Excessive pedestaling around vegetation provided the most evidence of past erosion. Several active gullies also traverse the study.

The dominant browse species is mountain big sagebrush, which had an average cover of 11% in 2001 and 14% in 2005. Sagebrush density estimates were nearly 4,000 plants/acre in 2001 and slightly increased to 4,360 in 2005. In 2001, the initial harrow treatment left the sagebrush decadent and in poor vigor. Percent decadence was 39% with over half of the population classified with poor vigor. In 2005, percent decadency dropped to 9% and only 4% of population displayed poor vigor. Young plants were abundant in 2001 and 2005 ranging from 660 to 780 plants/acre. With above normal precipitation in 2005, seedlings were very abundant. Use on sagebrush was light in 2001 and 2005. Annual leader growth averaged just over 2 inches in 2001 and 2005. Other browse sampled include stickyleaf low rabbitbrush, snowberry, rubber rabbitbrush, and gray horsebrush.

The herbaceous understory is abundant and diverse with 13 grasses and 30 forbs sampled in 2005. Some of the herbaceous species present are native residuals, while others were seeded as part of the pipe harrow treatment. Grasses averaged 11% cover in 2001 and 13% in 2005, while forbs averaged 5% cover in 2001 and 4% in 2005. Western wheatgrass and Salina wildrye are the most abundant grasses in 2001 and 2005. Grasses were difficult to identify in 2001 due to the lack of seedheads on many individuals. Western wheatgrass and Salina wildrye were particularly hard to distinguish from each other. Yellow Indian paintbrush and desert phlox were the most abundant forbs in 2001. By 2005, yellow indian paintbrush decreased significantly. Annual species were rarely encountered. There was noticeable utilization on grasses in 2001 with some individuals displaying heavy use, while light use was reported in 2005.

2001 APPARENT TREND ASSESSMENT

Soil condition is slightly down. Disturbance from the pipe harrow treatment has increased the amount of bare soil over what would normally occur. Erosion is slight, but soils should stabilize after the vegetative community has a few year to recover. The browse component is in a slightly downward condition due to the pipe harrow treatment. Percent decadence and poor vigor within the sagebrush population are high at the present time. However, the number of young in the population is encouraging. Percent decadence should decrease and vigor improve after a few growing seasons. The herbaceous understory is abundant and diverse and appears strong with few annual species present. The Desirable Components Index rated this site as fair

with a score of 62 due to moderate shrub cover, high percent decadence on shrubs, but excellent perennial grass cover.

2001 winter range condition (DC Index) - fair (62) Mid-level Potential scale

2005 TREND ASSESSMENT

Trend for soil is stable. Bare ground remained similar to 2001 observations and the ratio of protective cover (vegetation, litter, and cryptograms) to bare ground did not change much either. Trend for the key browse mountain big sagebrush is slightly up. Density increased from 3,980 plants/acre in 2001 to 4,360 in 2005. Percent decadency decreased from 39% in 2001 to 9% in 2005. The number of plants classified with poor vigor decreased from 57% in 2001 to 4% in 2005. Trend for the herbaceous understory is slightly up. The harrow treatment opened up the understory to allow herbaceous species to increase. Perennial grasses are fairly dominant and increased in sum of nested frequency by 25%, although perennial forbs decreased 18%. The Desirable Components Index rated this site as good with a score of 76 due to moderate shrub cover, low percent decadence on shrubs, and excellent perennial grass cover.

TREND ASSESSMENT
soil - stable (0)
browse - slightly up (+1)
herbaceous understory - slightly up (+1)
winter range condition (DC Index) - good (76) Mid-level Potential scale

HERBACEOUS TRENDS --
Management unit 17R, Study no: 7

Type	Species	Nested Frequency '01	Nested Frequency '05	Average Cover % '01	Average Cover % '05
G	Agropyron dasystachyum	-	4	-	.16
G	Agropyron intermedium	9	10	.07	.16
G	Agropyron smithii	$_{b}$208	$_{a}$137	7.38	2.05
G	Agropyron spicatum	18	17	.27	.31
G	Bromus inermis	-	1	-	.00
G	Carex sp.	-	7	.03	.04
G	Elymus cinereus	2	-	.03	-
G	Elymus junceus	-	-	-	.03
G	Elymus salina	$_{a}$87	$_{b}$164	2.52	6.44
G	Oryzopsis hymenoides	4	2	.06	.00
G	Poa fendleriana	$_{a}$4	$_{b}$92	.01	2.46
G	Poa pratensis	$_{b}$17	$_{a}$4	.43	.06
G	Poa secunda	20	36	.54	.81
G	Stipa lettermani	17	11	.14	.27
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		386	485	11.49	12.83

Type	Species	Nested Frequency		Average Cover %	
		'01	'05	'01	'05
Total for Grasses		386	485	11.49	12.83
F	Antennaria rosea	4	4	.03	.00
F	Androsace septentrionalis (a)	-	2	-	.03
F	Arabis sp.	$_{a}$2	$_{b}$27	.00	.10
F	Aster chilensis	-	10	-	.19
F	Astragalus cicer	$_{b}$13	$_{a}$-	.41	-
F	Astragalus convallarius	18	12	.21	.04
F	Astragalus tenellus	1	3	.03	.00
F	Castilleja flava	$_{b}$66	$_{a}$6	1.18	.04
F	Chenopodium album (a)	-	8	-	.02
F	Chaenactis douglasii	24	26	.14	.35
F	Chenopodium leptophyllum(a)	15	11	.04	.02
F	Cirsium sp.	-	3	-	.03
F	Cleome serrulata (a)	-	-	.00	-
F	Descurainia pinnata (a)	2	-	.00	-
F	Erigeron sp.	-	2	-	.00
F	Gilia sp. (a)	4	-	.01	-
F	Hedysarum boreale	$_{a}$11	$_{b}$29	.06	.96
F	Ipomopsis aggregata	$_{a}$-	$_{b}$19	-	.06
F	Lactuca serriola	-	2	-	.00
F	Linum lewisii	7	6	.04	.05
F	Lomatium sp.	-	-	-	.00
F	Lotus utahensis	2	-	.00	-
F	Machaeranthera canescens	36	45	.43	.76
F	Medicago sativa	4	-	.03	.00
F	Penstemon caespitosus	$_{b}$71	$_{a}$20	.65	.15
F	Penstemon palmeri	15	7	.40	.04
F	Petradoria pumila	-	5	-	.00
F	Penstemon watsonii	-	1	-	.00
F	Phlox austromontana	64	72	1.06	1.16
F	Phlox longifolia	-	5	-	.03
F	Polygonum douglasii (a)	2	2	.00	.00
F	Potentilla gracilis	7	-	.04	-
F	Sanguisorba minor	$_{b}$13	$_{a}$2	.18	.00
F	Schoencrambe linifolia	-	3	-	.01
F	Senecio multilobatus	3	1	.01	.01

Type	Species	Nested Frequency '01	Nested Frequency '05	Average Cover % '01	Average Cover % '05
F	Sphaeralcea coccinea	$_{b}$39	$_{a}$24	.25	.29
F	Taraxacum officinale	2	-	.03	-
F	Tragopogon dubius	4	-	.00	-
F	Trifolium sp.	2	-	.01	-
Total for Annual Forbs		23	23	0.07	0.08
Total for Perennial Forbs		408	334	5.26	4.34
Total for Forbs		431	357	5.33	4.42

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 17R, Study no: 7

Type	Species	Strip Frequency '01	Strip Frequency '05	Average Cover % '01	Average Cover % '05
B	Amelanchier utahensis	0	0	.00	-
B	Artemisia tridentata vaseyana	82	82	11.17	13.79
B	Chrysothamnus nauseosus	9	12	.21	1.58
B	Chrysothamnus viscidiflorus viscidiflorus	48	45	2.52	2.35
B	Gutierrezia sarothrae	0	11	-	1.21
B	Symphoricarpos oreophilus	5	10	.00	.01
B	Tetradymia canescens	4	8	-	.15
Total for Browse		148	168	13.92	19.10

CANOPY COVER, LINE INTERCEPT --
Management unit 17R, Study no: 7

Species	Percent Cover '05
Artemisia tridentata vaseyana	17.63
Chrysothamnus nauseosus	1.60
Chrysothamnus viscidiflorus viscidiflorus	4.13
Gutierrezia sarothrae	.15
Symphoricarpos oreophilus	.48
Tetradymia canescens	.21

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 17R, Study no: 7

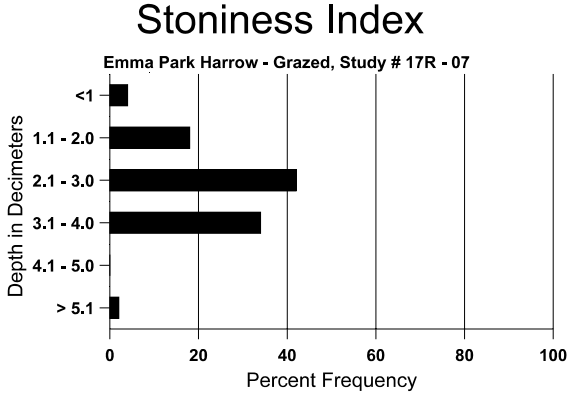
Species	Average leader growth (in) '05
Artemisia tridentata vaseyana	2.2

BASIC COVER --
Management unit 17R, Study no: 7

Cover Type	Average Cover % '01	'05
Vegetation	32.43	33.45
Rock	.14	.01
Pavement	.38	.40
Litter	46.17	38.37
Cryptogams	.31	.06
Bare Ground	35.73	38.75

SOIL ANALYSIS DATA --
Herd Unit 17R, Study no: 07, Emma Park Harrow-Grazed

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	ppm P	ppm K	dS/m
13.8	60.0 (16.1)	7.5	38.9	31.4	29.7	1.8	2.8	332.8	0.7



PELLET GROUP DATA --
Management unit 17R, Study no: 7

Type	Quadrat Frequency		Days use per acre (ha)	
	'01	'05	'01	'05
Rabbit	5	14	-	-
Elk	-	4	1 (2)	5 (13)
Deer	8	-	9 (22)	5 (12)
Cattle	-	3	-	15 (36)

BROWSE CHARACTERISTICS --
Management unit 17R, Study no: 7

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Amelanchier utahensis												
01	**0**	-	-	-	-	-	0	0	-	-	0	13/21
05	**0**	-	-	-	-	-	0	0	-	-	0	11/15
Artemisia tridentata vaseyana												
01	**3980**	260	660	1780	1540	340	0	0	39	5	57	17/24
05	**4360**	3800	780	3180	400	920	2	0	9	4	4	20/27
Chrysothamnus nauseosus												
01	**180**	-	40	40	100	-	0	0	56	-	22	19/21
05	**260**	40	20	240	-	-	0	0	0	-	0	22/25
Chrysothamnus viscidiflorus viscidiflorus												
01	**3820**	-	120	3540	160	-	0	0	4	-	1	5/9
05	**2600**	20	40	2480	80	20	0	0	3	.76	.76	8/14
Eriogonum corymbosum												
01	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**0**	-	-	-	-	-	0	0	-	-	0	11/17
Gutierrezia sarothrae												
01	**0**	-	-	-	-	-	0	0	-	-	0	-/-
05	**340**	-	-	340	-	-	0	0	-	-	0	8/13
Symphoricarpos oreophilus												
01	**240**	-	100	60	80	-	0	0	33	8	8	9/16
05	**280**	-	140	140	-	-	0	7	0	-	0	11/20
Tetradymia canescens												
01	**80**	20	-	20	60	-	0	0	75	25	50	-/-
05	**220**	20	80	140	-	-	0	0	0	-	0	9/12